



Amazing Stuff

Amazing Stuff? What is it?

Here's a hint. Even though it has the most unique properties of any substance on Earth, it's pretty easy to find. In fact, it's the most common substance on the planet. We are surrounded by it. It's in everything that lives; all living beings are made up mostly of it.

So what are we talking about?

WATER.

Facts

- Every living thing (organism) on Earth is *mostly* water. An elephant is 70 percent water; a tomato is 90 percent water; of mice and men, water is 65 percent.
- The quantity of water on Earth is static – 326 million cubic miles. One cubic mile contains 1,000,000,000,000 (one trillion) gallons of water.
- About 70 percent of Earth's surface is covered by water.
- Ninety-seven percent of Earth's water is in oceans. The remaining three percent is freshwater. Two of that three percent is held in ice caps or glaciers; .5 percent is groundwater; .02 percent is in lakes and rivers; .001 percent is in the atmosphere.
- Half the world's fish come from .001 percent of the ocean, along coastal areas.
- Eighty-five percent of the water vapor in the atmosphere evaporates from our oceans. Plant transpiration also adds much water to the air. Most trees give off about 70 gallons of water a day. One acre of corn transpires 4,000 gallons per day.



- From 20 to 50 percent of the water in streams comes from groundwater.

Properties

- Water is the only substance on Earth that exists naturally in three forms: solid (ice), liquid, and gas (water vapor or steam).
- Water moderates Earth's climate because it absorbs and releases heat slowly.
- It's called the *universal solvent* because, given time, it can dissolve anything except a few man-made compounds.
- Like most liquids, water becomes more dense as it gets cooler until it reaches 39 degrees F. Once it reaches 32 degrees, it expands instead and, because of this, floats. If it didn't, the sun couldn't melt it and bodies of water would only have a thin layer of water (the rest would be ice) on their surface and, even then, only in the summer. Aquatic life would not exist – no life would.
- Water weighs 62.4 lbs. per cubic foot.
- Water has very high surface tension. That's why water bugs can walk on it.
- Only ammonia absorbs heat better than water.
- It is the only *common* substance that exists as a liquid at normal temperatures. It freezes at 32 degrees and boils at 212 degrees F.

Human Use

- Demand for freshwater by humans is expected to double between 1989 and the year 2000.
- Factories use more water than any other material.
- *Per capita* use of water in the United States is about 1,600 gallons per person per day. Of that, about 70 gallons are for domestic use, 650 for irrigation and 820 for industry.
- Precipitation ends up in the following places: Municipalities, .42 percent; Irrigation, 2.46 percent; Industry, 3.12

- more

percent; Oceans, 24 percent; Evaporation, 70 percent.

- America has more faucets and toilets than any other country. Flushing a toilet uses about three gallons of water. Running a shower uses five gallons *a minute*; a bath takes about 35 gallons. Washing dishes by hand takes about five gallons; an automatic dishwasher uses about 30 gallons.

- It takes about 150 gallons of water to produce a newspaper.

- In the United States, water costs about 45¢ per 1,000 gallons.

- Public water utilities supply about 80 percent of the U.S. population. Most cities use groundwater, but most *large* cities depend mainly on surface water sources.

- Why can't we live off sea water? Our kidneys can't handle the salt. Sea water has about seven times the acceptable salt level. We would die of dehydration because our kidneys could not expel the excessive salt.

- The water in your body is billions of years old. It has been *recycled* millions of times.

Pollution

- Not all pollution is man-made. Volcanic ash, for example, can kill aquatic life. Some sediment pollution is caused by natural erosion, without which there would be no Grand Canyon. Man can do little to control natural pollution.

- According to the Federal Water Quality Administration, the United States' southeastern region, which includes Virginia, has the lowest percentage of polluted stream miles. Here's how all regions of the country fare: Southeast, 8 percent; Pacific States, 25 percent; Southern Plains, 29 percent; Northeast, 40 percent; Northern Plains, 42 percent.

- Nearby waterways had the following percentages of polluted miles: Susquehanna, 20 percent; Upper Chesapeake Bay, 10 percent; Potomac River, 15 percent.

- Water pollution originates from three major sources: industry, sewage and agriculture.

- By the year 2020, the United States will produce three times the sewage it did in 1970. Four-fifths is treated, 10 percent goes through septic systems and 10 percent goes untreated.

- Cholera, typhoid fever and dysentery are transmitted through water. Chlorination eliminates these diseases.

- The following are *not* eliminated by chlorine: Polychlorinated biphenyls (PCBs), chloroform, arsenic, lead and mercury pollution. All have been found in groundwater and municipal drinking water supplies.

- By volume, sediment (suspended soil particles) is the greatest pollutant.

- Pollutants from farmland include animal waste, excess nutrients (from fertilizer), sediment and pesticides. In the United States, waste from farm animals is estimated to be 20 times that produced by humans.

- Fertilizer and nutrients from farmland, household detergents and sewage stimulate excess algae growth in waterways. The algae die, respire and decay. If water has too much organic waste, such as dead algae, bacteria use more dissolved oxygen than usual. Most aquatic life does well in water with oxygen concentrations of nine parts per million. Concentrations less than five parts per million will asphyxiate some species.

- Some industries, such as steel mills, require good water quality for production. Others, such as tourism and commercial fisheries, suffer because of polluted water.

- Because water pollution can curtail economic growth, lower worker health standards and income can result.



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